

Trigonometry Review Problems

- The gravitational pull of the sun and moon on large bodies of water produces tides. Tides generally rise and fall twice every 25 hours. The range between high and low tide varies greatly with location. On the Pacific coast of America this range can be as much as 15 feet. The Bay of Fundy in New Brunswick has an extremely dramatic range of 45 feet. Can we model the tide level as a function of time?
- For what values of x is $\sin x = 0$?
 - For what values of x is $\cos x = 0$?
 - How can we simplify $\sin(x + 2\pi)$?
 - How can we simplify $\cos(x - 6\pi)$?
- Suppose that an angle measuring θ radians subtends an arc of a circle of radius r units. What is the length of that arc?
 - Suppose that an angle measuring α degrees subtends an arc of a circle of radius r units. What is the length of that arc?
- Use the symmetry of the unit circle to find the values of each of the following.
 - $\sin\left(-\frac{\pi}{4}\right)$
 - $\cos\left(\frac{2\pi}{3}\right)$
 - $\tan\left(\frac{11\pi}{6}\right)$
 - $\sin\left(\frac{13\pi}{4}\right)$
- You're interested in knowing the height of a tall tree. You position yourself so that your line of sight to the top of the tree makes a 60° angle with the horizontal. You measure the distance from where you stand to the base of the tree to be 45 feet. How tall is the tree? (Assume that your eyes are five feet above the ground.)
- A golfer, centered in a 30-yard-wide straight fairway, hits a ball 280 yards. Approximate the largest angle the drive can have from the center of the fairway if the ball is to stay in the fairway.
- Find each of the following.
 - $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$
 - $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$
 - $\tan^{-1} 1$
 - $\tan^{-1}(-1)$
- For each of the following equations, find all solutions that lie in the interval $[0, 2\pi)$.
 - $2 \cos x + \tan x = \sec x$
 - $\sin x \cos 2x + \cos x \sin 2x = 0$
 - $\sin\left(3x - \frac{\pi}{4}\right) = 1$